REMARKS

Original claims 1-30 remain in the case. Claims 1, 2, 11, 13, 28, and 30 are currently amended. Claims 31-33 have been cancelled.

The Amendments of
Process Claims 1, 2, and 11

Applicants have amended process claims 1 and 11 by: a) including additional limitations on the properties of the paraffinic wax feed to it having a weight ratio of molecules having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than 0.10, and b) increasing the ratio of weight percent of molecules containing monocycloparaffins to weight percent of molecules containing multicycloparaffins in the lubricating base oil from greater than 15 to greater than 20 and including the additional limitation that the lubricating base oil has a viscosity index greater than an amount calculated by the equation: VI = Ln(Kinematic Viscosity at 100°C) + 95.

Support for the amendments to claims 1 and 11 are included in the examples in Tables I, II and III, the section in the specification defining the wax feed on page 15, lines 11-25, and the section of the specification titled "Viscosity Index" on pages 32 and 33.

Applicants have amended claim 2 to include a narrower limit on the properties of the paraffinic wax feed to it having a weight ratio of molecules having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than 0.05. Support for the amendment to claim 2 are included in the examples in Table I.

Accordingly, the amendments to the process claims are proper and entry is respectfully requested.

The Amendments of Composition Claims 13 and 28

Applicants have amended composition claims 13 and 28 by increasing the ratio of weight percent of molecules containing monocycloparaffins to weight percent of molecules containing multicycloparaffins in the lubricating base oil from greater than 15 to greater than 20 and including the additional limitation that the lubricating base oil has a viscosity index greater than an amount calculated by the equation: VI = Ln(Kinematic Viscosity at 100°C) + 95.

Support for the amendments to claims 13 and 28 are included in the examples in Tables II and III, and in the section of the specification titled "Viscosity Index" on pages 32 and 33. Accordingly, the amendments to the process claims are proper and entry is respectfully requested.

The Amendment of Product by Process Claim 30

Applicants have amended claim 30 by: a) including the additional limitation that the lubricating base oil has a viscosity index greater than an amount calculated by the equation: VI = Ln(Kinematic Viscosity at 100°C) + 95; and b) including a limitation to the substantially paraffinic wax feed additionally having a weight ratio of molecules having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than 0.10.

Support for the amendment of claim 30 may be found in the specification as already described in the previous sections relating to the amendment of Claims 1, 2, 11, 13, and 28. Accordingly, the amendment to claim 30 is proper and entry is respectfully requested.

The Rejection of Process Claims 1-12
under 35 U.S.C. 103(a)

Claims 1-12 stand rejected as obvious over WO 02/064711 (hereafter referred to as "Daniel et al.") in view of U.S. Patent 4,673,487 (hereafter referred to as "Miller et al."). The Office Action notes that Daniel et al. discloses a lubricant and method for making the lubricant wherein the base oil in the lubricant has between 10 and 40 wt% cycloparaffins and the weight ratio of 1-ring cycloparaffins relative to cycloparaffins having two or more rings is preferably greater than 5. Because of the similarities between the lubricant of Daniel et al. and the lubricant of the Applicants' invention, the Office Action argues that the lubricant of Daniel et al.meets Applicants' claimed requirements. The Office Action also argues that it could be expected that Daniel et al. could be modified by using a feed to the process that has a weight ratio of compounds having at least 60 carbon atoms and compounds having at least 30 carbon atoms of less than 0.18 because the lower limit for this ratio as disclosed in Daniel et al. (0.20) is close to 0.18 and one might expect slight variances below the lower limit of Daniel et al. would still result in the production of an effective lube base oil because these slight variances would affect the characteristics of the final product only minimally. Applicants respectfully do not agree. As explained in greater detail below the process taught in Daniel et al. cannot be used to prepare lubricants having the desirable properties of Applicants' invention.

The Rejection of Composition Claims 13-29 under 35 U.S.C. 103(a)

Composition claims 13-29 stand rejected as obvious over Daniel et al. The Office Action notes that Daniel et al. discloses a lubricant and method for making the lubricant wherein the base oil in the lubricant has between 10 and 40 wt% cycloparaffins and the weight ratio of 1-ring cycloparaffins relative to cycloparaffins having two or more rings is preferably greater than 5. Because of the similarities between the lubricant of Daniel et al. and the lubricant of the Applicants' invention, the Office Action argues that the lubricants of Daniel et

al. meets Applicants' claimed requirements. The Office Action indicates that Daniel et al. does not disclose that the weight ratio of 1-ring cycloparaffins relative to cycloparaffins having two or more rings is greater than 15. The Office Action argues that it is expected that slight variances above the upper limit of Daniel et al. should fall within the claimed range of the Applicants' claims to still result in an effective base oil because the slight variances would affect the characteristics of the final product only minimally.

The Office Action also argues that it could be expected that Daniel et al. could be modified by using a feed to the process that has a weight ratio of compounds having at least 60 carbon atoms and compounds having at least 30 carbon atoms of less than 0.18 because the lower limit for this ratio as disclosed in Daniel et al. (0.20) is close to 0.18 and one might expect slight variances below the lower limit of Daniel et al. would still result in the production of an effective lube base oil because these slight variances would affect the characteristics of the final product only minimally. Applicants do not agree and will show that the lubricants taught in Daniel et al. fail to have the desirable properties of the lubricants claimed by Applicants.

The Rejection of Claim 30 under 35 U.S.C. 102(b)

Claim 30 stands rejected under 35 U.S.C. 102(b) as anticipated by WO 02/064711 (hereafter referred to as "Daniel et al."). With the amendment of claim 30, the invention covered by this claim may be readily distinguished from the cited reference.

The Rejection of Claims 31-33 under 35 U.S.C. 112

Claims 31-33 stand rejected under 35 U.S.C. 112 as being indefinite for failing to particularly point out and distinctly claim the invention. Applicants request that claims 31-33 be cancelled.

The Provisional Obviousness Double Patenting Rejections of Claims 1-12 and 13-30

Claims 1-12 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-30 of copending Application No. 10/744870. The claims of 10/744870 do not include the step of blending the lubricating base oil with at least one lubricant additive, but the Office Action indicates that it would have been obvious to have modified the claims of 10/744870 by including the step of blending the lubricating base oils with at least one lubricant additive.

Claims 13-30 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-34 of copending Application No. 10/744389. The claims of 10/744389 do not include the step of blending the lubricating base oil with at least one lubricant additive, but the Office Action indicates that it would have been obvious to have modified the claims of 10/744389 by including the step of blending the lubricating base oils with at least one lubricant additive.

The provisional obviousness-type double patenting rejections are not final because the conflicting claims have not in fact been patented. Applicants offer to file a terminal disclaimer should there be allowable subject matter in the claims of either 10/744870 or 10/744389.

Applicants' Claimed Invention

Applicants' invention resides in the discovery that very low levels (or the elimination of substantially all) of the molecules containing multicycloparaffins in lubricating base oils containing high amounts of molecules with at least one cycloparaffin function (either greater than three times the kinematic viscosity at 100°C or greater than 10 weight percent) significantly improves the viscosity index (VI) of lubricating base oils. In addition, very low levels of the molecules containing

multicycloparaffins in lubricating base oils improves the oxidation stability and Noack volatility of the lubricating base oils. The higher the ratio of molecules containing monocycloparaffins to molecules containing multicycloparaffins the higher the viscosity index of the lubricating base oil, when comparing lubricating base oils with equivalent high weight percent of molecules with at least one cycloparaffin function and equivalent kinematic viscosities. Applicants have discovered for the first time lubricating base oils having high amounts of molecules with at least one cycloparaffin function and a ratio of molecules containing monocycloparaffins to molecules containing multicycloparaffins greater than 20. The cited prior art neither anticipates nor would suggest to one skilled in the art Fischer-Tropsch derived compositions having ratios of molecules containing monocycloparaffins to molecules containing multicycloparaffins within the scope of Applicants' claimed invention. The highest ratio that Daniel et al. have demonstrated is 13. Applicants have shown that a ratio of greater than 20 is significantly better than 13 and provides for significantly improved viscosity indexes. Example 5 in Table III of the specification, for example, is a lubricating base oil of Applicants' invention with a ratio of molecules containing monocycloparaffins to molecules containing multicycloparaffins of 20.1 with a kinematic viscosity of 6.295 at 100°C. Example 5 has a viscosity index of 154, which is much greater than the maximum viscosity index taught to be obtainable by the teachings of Daniel et al. Daniel et al. on page 11, lines 25 to 28, states that the base oils used in their composition typically have a viscosity index of below 140. Example 5 has a viscosity index greater than an amount defined by the equation VI = 28 x Ln(Vis100) + 95, which in this case calculates to 146.5. As a result of the high ratio of molecules containing monocycloparaffins to molecules containing multicycloparaffins which characterize Applicants' claimed compositions, the resulting very high viscosity indexes of the lubricating base oils of Applicants' invention impart useful characteristics to the finished lubricants made from them. The

viscosity index of the lubricating base oils in Applicants' invention is greater than an amount calculated by the equation VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95. Nothing in the cited art suggests the process claimed by Applicants can be used to prepare compositions having these very desirable properties.

Applicants' invention also resides in the discovery that lubricating base oils having highly desirable molecular compositions (high amount of molecules with cycloparaffins and a ratio of molecules with monocycloparaffins to molecules with multicycloparaffins greater than 20) and high viscosity indexes (greater than an amount calculated the by the equation: VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95) can be made from a paraffinic waxy feed having a weight ratio of molecules having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than 0.10.

A ratio of less than 0.10 is significantly different from the lowest ratio of 0.20 that Daniel et al. teaches must be used in their process. It is desirable that a process using highly paraffinic wax with a ratio lower than 0.10 be used, as this type of wax is more readily available and easier to manufacture. A process using less expensive waxes having a lower ratio than 0.10 is commercially advantageous and would produce products which would be more competitive with conventionally produced base oils.

The Differences Between the Claimed Invention in Process Claims 1-12 and the Daniel et al. Reference

The process in Daniel et al. is restricted to having the feed to the process being a Fischer-Tropsch product having a weight ratio of compounds having at least 60 or more carbon atoms and compounds having at least 30 carbon atoms in the Fischer-Tropsch product of at least 0.2, preferably at least 0.4, and more preferably at least 0.55. The examples in Daniel et al. were all made with a substantially paraffinic wax feed having a weight ratio of molecules having at least

60 or more carbon atoms and molecules having at least 30 carbon atoms of 0.55. The Applicants' process, in contrast, uses a waxy paraffinic feed having a weight ratio of compounds having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than 0.10, and even uses feeds having no compounds having at least 60 or more carbon atoms (see examples in Table I). Waxy feeds with a weight ratio less than 0.10 are more plentiful and easier to manufacture than waxes with a weight ratio greater than 0.20. Applicants' process using a paraffinic wax with a weight ratio less than 0.10 is a much more preferred process over than taught in Daniel et al. Although Daniel et al. claims and teaches down to a weight ratio of 0.20, there is no suggestion that a feed with a weight ratio less than 0.10 would lead to the lubricating base oil with the composition and very high viscosity index claimed in Applicants' process.

The lubricating base oils prepared using the process of Daniel et al. all have lower viscosity indexes than the lubricating base oils that Applicants have invented. None of the lubricating base oils described in Daniel et al. have viscosity indexes greater than an amount calculated by the equation VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95. In general, they have viscosity indexes less than an amount defined by the equation VI = 28 x Ln(Kinematic Viscosity at 100°C) + 85, or more than 10 points lower than the lubricating base oils of Applicants' invention. For example, a lubricating base oil of Applicants' invention having a kinematic viscosity at 100°C of 4.234 cSt (same as Example 3 in Daniel et al.) would have a viscosity index greater than 135. The viscosity index of Example 3 in Daniel et al. however, only has a viscosity index of 125. A lubricating base oil of Applicants' invention having a kinematic viscosity at 100°C of 8 cst would have a viscosity index greater than 153. On the other hand, Daniel et al. on page 11, lines 25 to 28, states that the base oils used in their composition typically have a viscosity index of below 140.

The Office action has combined Daniel et al. with US Patent 4,673,487 (referred to as "Miller") which describes the use of hydrofinishing to improve the oxidation stability of base oils. However, Miller is not directed to the essence of Applicants' claimed process and fails to overcome the deficiencies of Daniel et al.

Applicants have argued that the process described in Daniel et al. employs a different feed from that used by Applicants' claimed process and produces a different product which has significantly different properties from those made in Applicants' process. Consequently, it may be properly concluded that the general description contained in Daniel et al. certainly does not put the public in possession of Applicants' claimed process nor would it suggest Applicants' claimed process to one skilled in the art.

The Differences Between the Claimed Invention in Composition Claims 13-29 and the Daniel et al. Reference

Daniel et al. on page 10, lines 21-25, states that their base oil compositions have a weight ratio of 1-ring cyclo-paraffins relative to cycloparaffins having two or more rings greater than 3 and suitably smaller than 15. Applicants' invention instead has improved base oil compositions with a weight ratio of molecules containing monocycloparaffins (1-ring cycloparaffins) to molecules containing multicycloparaffins (cycloparaffins having two or more rings) greater than 20, and preferably even higher. The higher ratios of Applicants' invention provide lubricating base oils with higher VI, lower Noack volatility, and improved oxidation stability.

In addition, Daniel et al. on page 11, lines 28-30, states that their base oil compositions preferably have kinematic viscosities between 4 and 8 cSt, and also preferably have viscosity indexes higher than 120, and typically less than 140. Applicants' invention, in contrast, have base oil compositions with much improved viscosity indexes, generally greater than an amount calculated by

the equation: VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95. The base oil compositions used to prepare the finished lubricants which represent Applicants' invention have VIs at least 10 points higher than the VIs of the base oil compositions described in Daniel et al. A finished lubricant prepared using the base oils described in Daniel et al. would not have the highly desirable properties of the lubricants prepared using the base oils which are the essence of Applicants' invention.

The general description contained in Daniel et al. certainly does not put the public in possession of Applicants' claimed composition nor would it suggest Applicants' claimed composition to one skilled in the art.

The Differences Between the Product by Process in Claim 30 and the Daniel et al. Reference

Daniel et al. fails to teach that base oils having a viscosity index greater than an amount calculated by the equation VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95 are obtainable by the process described in the reference. Daniel et al. also fails to teach that base oils having the high viscosity of the Applicants' invention are obtainable by dewaxing a substantially waxy feed having a weight ratio of molecules having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than 0.10. Since Section 102(b) of the Statute requires that all limitations of the claims must be met for the reference to be a complete anticipation of the invention, it is submitted that with the amendment of claim 30 the rejection under 35 U.S.C. 102(b) is no longer tenable.

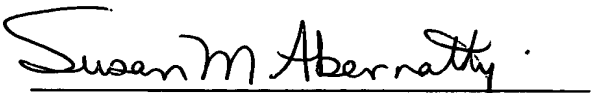
As detailed above, both the process used to prepare the finished lubricant and the composition of amended Claim 30 are novel from what are taught in Daniel et al. Applicants' invention uses a different paraffinic wax feed and produces lubricating base oils having higher viscosity indexes than what is achievable using the teachings of Daniel et al.

Conclusion

Applicants have argued that Daniel et al. fails to teach or suggest the essence of Applicants' invention. Applicants' process uses a significantly different and preferred wax feed than that used in Daniel et al. Applicants' process makes a different and higher value finished lubricant than what is obtained or suggested by Daniel et al. The lubricating base oil used in the Applicants' finished lubricant composition has an improved molecular composition and much higher viscosity index than what is obtained or suggested by Daniel et al. The secondary reference, Miller, fails to overcome the deficiencies of the primary reference.

It is respectfully submitted that in view of the amendments to the claims in the application, all of the claims remaining in the case are now directed to patentable subject matter, and allowance in due course is respectfully solicited.

Respectfully submitted,



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MARKED-UP CURRENTLY AMENDED CLAIMS

Claim 1. (Currently Amended) A process for manufacturing a finished lubricant, comprising the steps of:

a. performing a Fischer-Tropsch synthesis on syngas to provide a product stream;

b. isolating from said product stream a substantially paraffinic wax feed having:

i. less than about 30 ppm total combined nitrogen and sulfur; [and]

ii. less than about 1 weight percent oxygen;

iii. a weight ratio of molecules having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than 0.10;

c. dewaxing said substantially paraffinic wax feed by hydroisomerization dewaxing using a shape selective intermediate pore size molecular sieve comprising a noble metal hydrogenation component, wherein the hydroisomerization temperature is between about 600°F (315°C) and about 750°F (399°C), whereby an isomerized oil is produced;

d. hydrofinishing said isomerized oil, whereby a lubricating base oil is produced having:

i. a weight percent of all molecules with at least one aromatic function less than 0.30;

ii. a weight percent of all molecules with at least one cycloparaffin function greater than 10;

iii. a ratio of weight percent of molecules containing monocycloparaffins to weight percent of molecules containing multicycloparaffins greater than [15] 20;

iv. a viscosity index greater than an amount calculated by the equation: VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95; and

e. blending the lubricating base oil with at least one lubricant additive.

Claim 2. (Currently Amended) The process of claim 1, wherein said substantially paraffinic wax feed has a weight ratio of molecules having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than [0.18] 0.05, and a T90 boiling point between 660°F (349°C) and 1200°F (649°C).

Claim 11. (Currently Amended) A process for manufacturing a finished lubricant, comprising the steps of:

a. performing a Fischer-Tropsch synthesis on syngas to provide a product stream;
b. isolating from said product stream a substantially paraffinic wax feed having less than about 30 ppm total combined nitrogen and sulfur, [and]less than about 1 weight percent oxygen, and a weight ratio of molecules having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than 0.10;
c. dewaxing said substantially paraffinic wax feed by hydroisomerization dewaxing using a shape selective intermediate pore size molecular sieve comprising a noble metal hydrogenation component, wherein the hydroisomerization temperature is between about 600°F (315°C) and about 750°F (399°C), whereby an isomerized oil is produced;
d. hydrofinishing said isomerized oil, whereby a lubricating base oil is produced having:
    i. a weight percent of all molecules with at least one aromatic function less than 0.30;
    ii. a weight percent of all molecules with at least one cycloparaffin function greater than the kinematic viscosity at 100°C multiplied by three;

iii. a ratio of weight percent molecules containing monocycloparaffins to weight percent of molecules containing multicycloparaffins greater than [15] 20;

iv. a viscosity index greater than an amount calculated by the equation VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95; and

e. blending the lubricating base oil with at least one lubricant additive.

Claim 13. (Currently Amended) A finished lubricant comprising:

a. a lubricating base oil made from Fischer-Tropsch wax, having:

i. a weight percent of all molecules with at least one aromatic function less than 0.30;

ii. a weight percent of all molecules with at least one cycloparaffin function greater than 10;

iii. a ratio of weight percent of molecules containing monocycloparaffins to weight percent of molecules containing multicycloparaffins greater than 20;

iv. a viscosity index greater than an amount calculated by the equation: VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95; and

b. at least one lubricant additive.

Claim 28. (Currently Amended) A finished lubricant comprising:

a. a lubricating base oil made from Fischer-Tropsch wax, having:

i. a weight percent of all molecules with at least one aromatic function less than 0.30;

ii. a weight percent of all molecules with at least one cycloparaffin function greater than the kinematic viscosity at 100°C multiplied by three;

iii. a ratio of weight percent of molecules containing monocycloparaffins to weight percent of molecules containing multicycloparaffins greater than [15] 20;

iv. a viscosity index greater than an amount calculated by the equation: VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95; and

b. at least one lubricant additive.

Claim 30. (Currently Amended) A finished lubricant made by the process comprising the steps of:

a. performing a Fischer-Tropsch synthesis on syngas to provide a product stream;

b. isolating from said product stream a substantially paraffinic wax feed having less than about 30 ppm total combined nitrogen and sulfur, [and] less than about 1 weight percent oxygen, and a weight ratio of molecules having at least 60 or more carbon atoms and molecules having at least 30 carbon atoms less than 0.10;

c. dewaxing said substantially paraffinic wax feed by hydroisomerization dewaxing using a shape selective intermediate pore size molecular sieve comprising a noble metal hydrogenation component, wherein the hydroisomerization temperature is between about 600°F (315°C) and about 750°F (399°C), whereby an isomerized oil is produced;

d. hydrofinishing said isomerized oil, whereby a lubricating base oil is produced having a viscosity index greater than an amount defined by the equation: VI = 28 x Ln(Kinematic Viscosity at 100°C) + 95; and

e. blending the lubricating base oil with at least one lubricant additive.